UNIVERSITY OF AGRICULTURAL SCIENCES AND VETERINARY MEDICINE CLUJ-NAPOCA, DOCTORAL SCHOOL OF AGRICULTURAL ENGINEERING SCIENCES

HABILITATION THESIS

Research on the Contribution of the Circular Economy to the Advancement of Sustainable Development

Field: **Engineering and Management in Agriculture and Rural Development**

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ABSTRACT

The circular economy is a concept that has recently gained popularity as a solution to global environmental and equity challenges. Scientific literature, industry, governments, and individuals have increasingly supported the transition from a linear, reductive model of production to a holistic and sustainable approach that aims to close the loop of the linear economy. In the public sphere, the notion of sustainability and various initiatives related to individual and corporate social responsibility are being discussed more frequently. While such initiatives can effectively address local issues, truly sustainable solutions must span multiple sectors, requiring broader, systemic approaches.

The circular economy integrates the aforementioned tools, amplifies them systemically, and elevates them to a higher level. Thus, we can consider the circular economy as a means of implementing sustainability at the systemic level. However, in order to understand and support the transition to a circular economy, people must be equipped with the appropriate mindset and conceptual tools.

The aim of this thesis is to present a synthesis of the author's scientific and professional achievements, published after obtaining the Ph.D. title in Engineering and Management in 2011, with the doctoral thesis titled "Corporate social responsibility through partnerships between businesses and NGOs for company sustainability" (supervisor: Prof. Dr. Eng. Dan Cândea).
My dual qualification as an engineer and economist has enabled me to understand the intersection between sustainability and the circular economy, and the immense research potential in this field. The founding of the "Ernest Lupan" Research Institute for Circular Economy and Environment marked a significant step forward for scientific progress in this area, serving as a bridge for applying scientific principles in the numerous national and international projects I have coordinated and continue to lead.

The habilitation thesis titled "A Multilevel Analysis of the Contributions of the Circular Economy to Sustainable Development" focuses on achievements that demonstrate the author's ability to lead scientific research in the field of Engineering and Management in Agriculture and Rural Development, with applications in circular economy and sustainable development. These achievements are presented in the context of the current state of scientific research in the field.

As we face the dynamic progress of the transition toward a circular economy—seen as a key element in building sustainability—there is a growing need for conceptual frameworks that support foresight studies based on multidisciplinary collaboration. Understanding the circular economy as a complex concept with wide-reaching implications across industrial and non-industrial sectors, my research activity has been structured around the idea that, to fully grasp this concept, all levels of application must be rigorously investigated, from the individual level to national systems.

The first chapter of the thesis succinctly outlines, across three dimensions—teaching, professional, and research—the achievements following the awarding of the doctoral degree. It includes a list of the author’s publications, participation in and coordination of national and international projects, and major professional affiliations (such as the European Circular Economy Stakeholder Platform - ECESP, the Romanian Standards Association - ASRO, and the Advisory

Council for Research, Development and Innovation - CCDI).

The second chapter synthesizes research findings regarding the circular economy's contributions at the consumer level. It presents key results on awareness and circular practices based on quantitative studies conducted with Romanian consumers.

The third chapter addresses the organizational level, along with concepts such as circular business models and corporate responsibility. This chapter also includes the circularity assessment framework developed by the author for evaluating organizations.

The fourth chapter focuses on cities and their transition to circularity. It introduces a new conceptual framework for circular economy in urban environments, developed through the application of a systematic review methodology.

The fifth chapter analyzes the European system for monitoring the transition to a circular economy and proposes improvements based on literature analysis and identified gaps.

Finally, the last chapter presents a career development and evolution plan. As a research direction, it proposes a novel analytical perspective on the circular economy grounded in fundamental physics scalars. Alongside objectives such as publishing in high-ranking journals and participating in national and international scientific events, equal emphasis is placed on didactic and professional development. This includes the creation of educational materials focused on circular economy and sustainability, as well as engaging and training students in this emerging field.

In conclusion, the continuous development of research methods and theoretical frameworks for studying the circular economy and sustainability—and identifying ways to apply them in practice—represents a central focus of my scientific activity. This is reflected in the results published in various ISI-ranked journals and presented at national and international conferences. Recognizing that the transition to a circular economy can only be achieved through systemic intervention, my publications aim to support the identification of solutions at every level where circular economy principles can be applied to achieve sustainable outcomes—whether for consumers, organizations, or communities.

In closing, I affirm that my research activity, along with its related components, also serves as an indirect advocacy for combining the best available research methods within a multidisciplinary context capable of adding value to both fundamental and empirical research. In domains such as industrial engineering and circular economy—which themselves are a convergence of disciplines and methods—I confidently assert that this heterogeneity is an advantage that can ensure scientific advancement in the field.

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